2010-10-21 Pd 2

Consider $\int 2x\left(x^2+7\right)^{2011}\,dx$

$\int u^{2011}\,du$

Let $u = (x^2+7)$

$(dx)\frac{du}{dx} = 2x(dx)$

$du = 2x\,dx$

$\int (u)^{2011}\,du$

$\int u^{2011}\,du = \frac{u^{2012}}{2012} + C = \frac{(x^2+7)^{2012}}{2012} + C$

$$\int (\sin x)(\cos x)^{32}\,dx \qquad \int u^{32}\,du$$

Let $u = \cos x$

$$\frac{du}{dx} = -\sin x$$

$$-du = +\sin x\,dx$$

$$= -\int u^{32}\,du$$

$$= -\frac{u^{33}}{33} + C$$

$$= -\frac{\cos^{33} x}{33} + C$$

2010-10-21 Pd 3

$$\int 2x\left(x^2-3\right)^{2011}dx$$

Let $u = x^2-3$

$(dx)\frac{du}{dx} = 2x(dx)$

$du = 2x\,dx$ (1)

$$\int u^{2011}\,du = \frac{u^{2012}}{2012}+C$$

$$\int (u)^{2011}\,du = \frac{u^{2012}}{2012}+C$$

$$= \frac{(x^2-3)^{2012}}{2012}+C$$

$$-\int \sin x \,(\cos x)^{32}\,dx$$

Let $u = \cos x$

$\frac{du}{dx} = -\sin x$

$du = -\sin x\,dx$

$$-\int (u)^{32}\,du$$

$$= -\frac{u^{33}}{33} + C$$

$$= -\frac{(\cos x)^{33}}{33} + C$$

$$\frac{d}{dx}\left(-\frac{(\cos x)^{33}}{33} + C\right)$$

$$= (-1)\frac{d}{dx}\frac{(\cos x)^{33}}{33} + 0$$

$$= (-1)\left(\frac{33(\cos x)^{32}\left(\frac{d}{dx}(\cos x)\right)}{33}\right) = (-)(\cos x)^{32}(-\sin x)$$

#1 a) $\int 2x\,(x^2+1)^{23}\,dx$; $u = x^2+1$

b) $\int \cos^3 x \sin x\,dx$; $u = \cos x$

c) $2\int \frac{1}{2\sqrt{x}} \sin\sqrt{x}\,dx$; $u = \sqrt{x}$

$du = \frac{1}{2\sqrt{x}}\,dx$